

Data sheet

## Shut-off ball valve for high pressure

Type GBCT for transcritical R744 / CO<sub>2</sub> (140 bar / 2031 psig)



Danfoss shut-off ball valves, type GBCT for R744 (CO<sub>2</sub>) high pressure are manually operated shut-off valves for transcritical CO<sub>2</sub> refrigeration systems, in order to open and to shut off inner flow path by operating the valve spindle.

The valve structure and materials are designed and tested specifically for use with CO<sub>2</sub> refrigerant. The valves are approved for use in transcritical CO<sub>2</sub> refrigeration systems.

### Features

- Designed for transcritical CO<sub>2</sub> systems
- Maximum working pressure (PS): 140 bar / 2031 psig
- Temperature range (TS): -40 °C – 149 °C / -40 °F – 300 °F
- UL/cUL Listed, complies with Pressure Equipment Directive 2014/68/ EU
- Full port construction to match line size
- Rupture proof, internally-loaded spindle design ensures safe operation under extreme pressures
- Specially-selected sealing material for CO<sub>2</sub> refrigerant
- Reinforced copper-iron tube extensions permit trouble-free valve installation with traditional torch-brazing methods
- Bleed hole design avoids liquid entrapment when valve is closed

Approvals



Technical data

|                                                          |                                   |
|----------------------------------------------------------|-----------------------------------|
| Refrigerants                                             | R 744 (CO <sub>2</sub> )          |
| Oils:                                                    | POE, PAG                          |
| Continuous operating temperature (COT)                   | -40 °C – 149 °C / -40 °F – 300 °F |
| Design Pressure (DP)/<br>Maximum abnormal pressure (MAP) | 140 bar / 2031 psig               |
| Flow direction                                           | bi-flow                           |

HIGH PRESSURE SIDE "HP"      LOW PRESSURE SIDE "LP"



**Danfoss recommends that valves are installed so that the HP side is oriented towards the highest pressure side of the system when the valve is in the closed position.**



**CAUTION - RISK OF HIGH PRESSURE**

Do not close with CO<sub>2</sub> liquid temperature below ambient. This component shall be installed along with a pressure relief valve set to discharge at no higher than the rated pressure of this component. This component is intended for systems in which the critical pressure of the refrigerant will be exceeded. The relief valve shall comply with the requirements of ASME Section VIII, be marked "UV" and sized based on the refrigeration system capacity.



**Notes: For the application use with R744 as part of a secondary loop or cascade:**

1. The design pressure of the refrigerant containing component is not less than the design pressure of the associated components.
2. The component is not provided with any pressure relief or pressure regulating relief valve and that a sufficient number of valves having capacity deemed adequate shall be field-installed on the refrigeration system.
3. When the refrigeration system is de-energized, venting of R744 may occur through the pressure regulating relief valves, and may need to be recharged, but the valve should not be defeated or bypassed.
4. A sufficient number of pressure relief and pressure regulating valves may need to be provided based upon system capacity and located such that no stop valve is provided between the relief valve and the parts or section of the system being protected.

Ordering



**GBCT without access port**

| Type     | Size [inch] | K <sub>v</sub> value [m <sup>3</sup> /h] | C <sub>v</sub> value [gal/min] | Multi pack [Pcs. per pack] | Code no. |
|----------|-------------|------------------------------------------|--------------------------------|----------------------------|----------|
| GBCT 6s  | 1/4         | 0.9                                      | 1.0                            | 30                         | 009L6415 |
| GBCT 10s | 3/8         | 3.7                                      | 4.3                            | 30                         | 009L6416 |
| GBCT 12s | 1/2         | 5.4                                      | 6.2                            | 30                         | 009L6417 |
| GBCT 16s | 5/8         | 10.4                                     | 12.1                           | 30                         | 009L6418 |
| GBCT 18s | 3/4         | 16.4                                     | 19.0                           | 16                         | 009L6419 |
| GBCT 22s | 7/8         | 23.7                                     | 27.5                           | 16                         | 009L6420 |
| GBCT 28s | 1 1/8       | 42.3                                     | 48.9                           | 4                          | 009L6406 |
| GBCT 35s | 1 3/8       | 67.1                                     | 77.6                           | 4                          | 009L6410 |
| GBCT 42s | 1 5/8       | 83.1                                     | 96.1                           | 4                          | 009L6411 |
| GBCT 54s | 2 1/8       | 171.3                                    | 198.0                          | 2                          | 009L6412 |



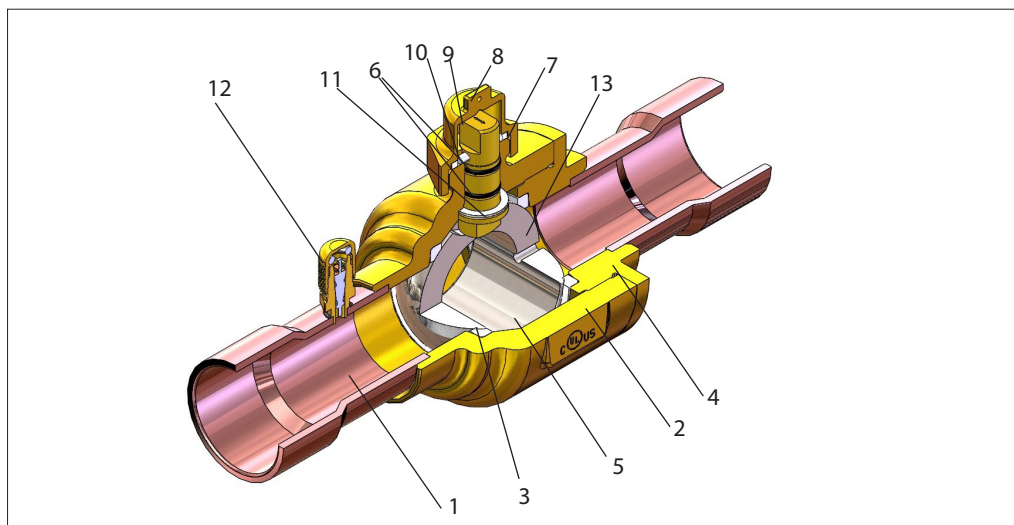
**GBCT with access port**

| Type     | Size [inch] | K <sub>v</sub> value [m <sup>3</sup> /h] | C <sub>v</sub> value [gal/min] | Multi pack [Pcs. per pack] | Code no. |
|----------|-------------|------------------------------------------|--------------------------------|----------------------------|----------|
| GBCT 6s  | 1/4         | 0.9                                      | 1.0                            | 30                         | 009L6581 |
| GBCT 10s | 3/8         | 3.7                                      | 4.3                            | 30                         | 009L6582 |
| GBCT 12s | 1/2         | 5.4                                      | 6.2                            | 30                         | 009L6585 |
| GBCT 16s | 5/8         | 10.4                                     | 12.1                           | 30                         | 009L6586 |
| GBCT 18s | 3/4         | 16.4                                     | 19.0                           | 16                         | 009L6588 |
| GBCT 22s | 7/8         | 23.7                                     | 27.5                           | 16                         | 009L6589 |
| GBCT 28s | 1 1/8       | 42.3                                     | 48.9                           | 4                          | 009L6451 |
| GBCT 35s | 1 3/8       | 67.1                                     | 77.6                           | 4                          | 009L6453 |
| GBCT 42s | 1 5/8       | 83.1                                     | 96.1                           | 4                          | 009L6454 |
| GBCT 54s | 2 1/8       | 171.3                                    | 198.0                          | 2                          | 009L6456 |

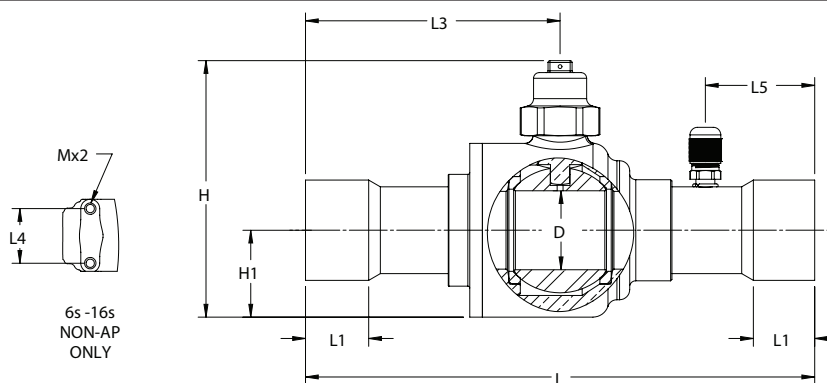
**Data sheet | Shut-off ball valve for high pressure, type GBCT for transcritical R744 / CO2 (140 bar / 2031 psi)**

**Design / Function**

1. Copper-Iron extension tubes
2. Valve body
3. Ball seat (PTFE)
4. Valve tail
5. Stainless steel ball
6. Double O-ring seal in spindle
7. Cap seal (PTFE)
8. Seal cap
9. Spindle
10. Pin
11. Guide ring
12. Valve core
13. Bleed hole



**Dimensions and weights**

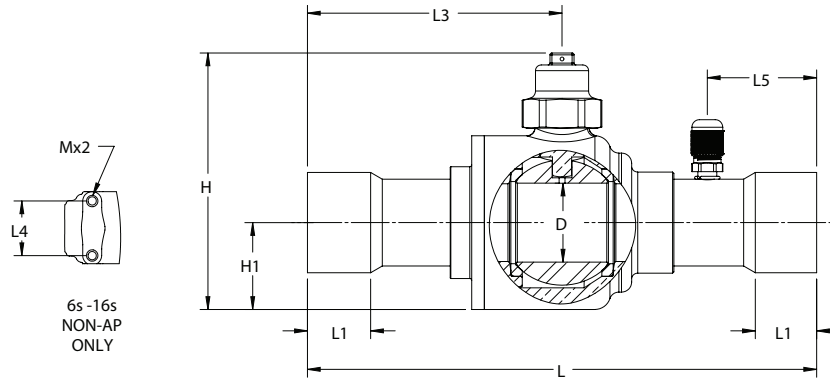


SI units

| Type     | Connection<br>[inch] | Access<br>port | H<br>[mm] | H1<br>[mm] | L<br>[mm] | L1 MIN<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | M<br>[mm] | D<br>[mm] | Weight<br>[Kg] | Code no. |
|----------|----------------------|----------------|-----------|------------|-----------|----------------|------------|------------|------------|-----------|-----------|----------------|----------|
| GBCT 6s  | 1/4                  | No             | 57        | 14         | 127       | 6.4            | 70         | 22         | N/A        | M4 x 0.7  | 13        | 0.21           | 009L6415 |
| GBCT 10s | 3/8                  | No             | 57        | 14         | 132       | 7.9            | 72         | 22         | N/A        | M4 x 0.7  | 13        | 0.22           | 009L6416 |
| GBCT 12s | 1/2                  | No             | 57        | 14         | 139       | 9.7            | 75         | 22         | N/A        | M4 x 0.7  | 13        | 0.22           | 009L6417 |
| GBCT 16s | 5/8                  | No             | 57        | 14         | 148       | 12.7           | 80         | 22         | N/A        | M4 x 0.7  | 13        | 0.23           | 009L6418 |
| GBCT 18s | 3/4                  | No             | 87        | 32         | 148       | 15.7           | 78         | N/A        | N/A        | N/A       | 19        | 0.66           | 009L6419 |
| GBCT 22s | 7/8                  | No             | 87        | 32         | 185       | 19.1           | 97         | N/A        | N/A        | N/A       | 19        | 0.68           | 009L6420 |
| GBCT 28s | 1 1/8                | No             | 102       | 37         | 185       | 23.1           | 96         | N/A        | N/A        | N/A       | 25        | 1.31           | 009L6406 |
| GBCT 35s | 1 3/8                | No             | 103       | 35         | 205       | 24.6           | 103        | N/A        | N/A        | N/A       | 32        | 1.95           | 009L6410 |
| GBCT 42s | 1 5/8                | No             | 113       | 40         | 240       | 27.7           | 120        | N/A        | N/A        | N/A       | 38        | 2.93           | 009L6411 |
| GBCT 54s | 2 1/8                | No             | 144       | 52         | 275       | 34.0           | 137        | N/A        | N/A        | N/A       | 51        | 6.07           | 009L6412 |

| Type     | Connection<br>[inch] | Access<br>port | H<br>[mm] | H1<br>[mm] | L<br>[mm] | L1 MIN<br>[mm] | L3<br>[mm] | L4<br>[mm] | L5<br>[mm] | M<br>[mm] | D<br>[mm] | Weight<br>[Kg] | Code no. |
|----------|----------------------|----------------|-----------|------------|-----------|----------------|------------|------------|------------|-----------|-----------|----------------|----------|
| GBCT 6s  | 1/4                  | Yes            | 57        | 14         | 127       | 6.4            | 55         | N/A        | 44         | N/A       | 13        | 0.27           | 009L6581 |
| GBCT 10s | 3/8                  | Yes            | 57        | 14         | 132       | 7.9            | 58         | N/A        | 46         | N/A       | 13        | 0.27           | 009L6582 |
| GBCT 12s | 1/2                  | Yes            | 57        | 14         | 139       | 9.7            | 61         | N/A        | 50         | N/A       | 13        | 0.28           | 009L6585 |
| GBCT 16s | 5/8                  | Yes            | 57        | 14         | 148       | 12.7           | 66         | N/A        | 54         | N/A       | 13        | 0.28           | 009L6586 |
| GBCT 18s | 3/4                  | Yes            | 87        | 32         | 148       | 15.7           | 78         | N/A        | 33         | N/A       | 19        | 0.67           | 009L6588 |
| GBCT 22s | 7/8                  | Yes            | 87        | 32         | 185       | 19.1           | 97         | N/A        | 40         | N/A       | 19        | 0.70           | 009L6589 |
| GBCT 28s | 1 1/8                | Yes            | 102       | 37         | 185       | 23.1           | 96         | N/A        | 40         | N/A       | 25        | 1.32           | 009L6451 |
| GBCT 35s | 1 3/8                | Yes            | 103       | 35         | 205       | 24.6           | 103        | N/A        | 44         | N/A       | 32        | 1.96           | 009L6453 |
| GBCT 42s | 1 5/8                | Yes            | 113       | 40         | 240       | 27.7           | 120        | N/A        | 50         | N/A       | 38        | 2.94           | 009L6454 |
| GBCT 54s | 2 1/8                | Yes            | 144       | 52         | 275       | 34.0           | 137        | N/A        | 56         | N/A       | 51        | 6.09           | 009L6456 |

Dimensions and weights



US units

| Type     | Connection<br>[inch] | Access<br>port | H<br>[inch] | H1<br>[inch] | L<br>[inch] | L1 MIN<br>[inch] | L3<br>[inch] | L4<br>[inch] | L5<br>[inch] | M<br>[mm] | D<br>[inch] | Weight<br>[lb] | Code no. |
|----------|----------------------|----------------|-------------|--------------|-------------|------------------|--------------|--------------|--------------|-----------|-------------|----------------|----------|
| GBCT 6s  | 1/4                  | No             | 2.2         | 0.6          | 5.0         | 0.25             | 2.8          | 0.9          | N/A          | M4 x 0.7  | 0.5         | 0.47           | 009L6415 |
| GBCT 10s | 3/8                  | No             | 2.2         | 0.6          | 5.2         | 0.31             | 2.8          | 0.9          | N/A          | M4 x 0.7  | 0.5         | 0.48           | 009L6416 |
| GBCT 12s | 1/2                  | No             | 2.2         | 0.6          | 5.5         | 0.38             | 3.0          | 0.9          | N/A          | M4 x 0.7  | 0.5         | 0.49           | 009L6417 |
| GBCT 16s | 5/8                  | No             | 2.2         | 0.6          | 5.8         | 0.50             | 3.1          | 0.9          | N/A          | M4 x 0.7  | 0.5         | 0.50           | 009L6418 |
| GBCT 18s | 3/4                  | No             | 3.4         | 1.3          | 5.8         | 0.62             | 3.1          | N/A          | N/A          | N/A       | 0.7         | 1.46           | 009L6419 |
| GBCT 22s | 7/8                  | No             | 3.4         | 1.3          | 7.3         | 0.75             | 3.8          | N/A          | N/A          | N/A       | 0.7         | 1.51           | 009L6420 |
| GBCT 28s | 1 1/8                | No             | 4.0         | 1.5          | 7.3         | 0.91             | 3.8          | N/A          | N/A          | N/A       | 1.0         | 2.89           | 009L6406 |
| GBCT 35s | 1 3/8                | No             | 4.1         | 1.4          | 8.1         | 0.97             | 4.1          | N/A          | N/A          | N/A       | 1.3         | 4.29           | 009L6410 |
| GBCT 42s | 1 5/8                | No             | 4.4         | 1.6          | 9.4         | 1.09             | 4.7          | N/A          | N/A          | N/A       | 1.5         | 6.46           | 009L6411 |
| GBCT 54s | 2 1/8                | No             | 5.7         | 2.0          | 10.8        | 1.34             | 5.4          | N/A          | N/A          | N/A       | 2.0         | 13.39          | 009L6412 |

| Type     | Connection<br>[inch] | Access<br>port | H<br>[inch] | H1<br>[inch] | L<br>[inch] | L1 MIN<br>[inch] | L3<br>[inch] | L4<br>[inch] | L5<br>[inch] | M<br>[mm] | D<br>[inch] | Weight<br>[lb] | Code no. |
|----------|----------------------|----------------|-------------|--------------|-------------|------------------|--------------|--------------|--------------|-----------|-------------|----------------|----------|
| GBCT 6s  | 1/4                  | Yes            | 2.2         | 0.6          | 5.0         | 0.25             | 2.2          | N/A          | 1.7          | N/A       | 0.5         | 0.59           | 009L6581 |
| GBCT 10s | 3/8                  | Yes            | 2.2         | 0.6          | 5.2         | 0.31             | 2.3          | N/A          | 1.8          | N/A       | 0.5         | 0.60           | 009L6582 |
| GBCT 12s | 1/2                  | Yes            | 2.2         | 0.6          | 5.5         | 0.38             | 2.4          | N/A          | 2.0          | N/A       | 0.5         | 0.61           | 009L6585 |
| GBCT 16s | 5/8                  | Yes            | 2.2         | 0.6          | 5.8         | 0.50             | 2.6          | N/A          | 2.1          | N/A       | 0.5         | 0.62           | 009L6586 |
| GBCT 18s | 3/4                  | Yes            | 3.4         | 1.3          | 5.8         | 0.62             | 3.1          | N/A          | 1.3          | N/A       | 0.7         | 1.49           | 009L6588 |
| GBCT 22s | 7/8                  | Yes            | 3.4         | 1.3          | 7.3         | 0.75             | 3.8          | N/A          | 1.6          | N/A       | 0.7         | 1.54           | 009L6589 |
| GBCT 28s | 1 1/8                | Yes            | 4.0         | 1.5          | 7.3         | 0.91             | 3.8          | N/A          | 1.6          | N/A       | 1.0         | 2.92           | 009L6451 |
| GBCT 35s | 1 3/8                | Yes            | 4.1         | 1.4          | 8.1         | 0.97             | 4.1          | N/A          | 1.7          | N/A       | 1.3         | 4.32           | 009L6453 |
| GBCT 42s | 1 5/8                | Yes            | 4.4         | 1.6          | 9.4         | 1.09             | 4.7          | N/A          | 2.0          | N/A       | 1.5         | 6.49           | 009L6454 |
| GBCT 54s | 2 1/8                | Yes            | 5.7         | 2.0          | 10.8        | 1.34             | 5.4          | N/A          | 2.2          | N/A       | 2.0         | 13.42          | 009L6456 |

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